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THE MAKING OF MODERN RACES.

BY DR. P. CHALMERS MITCHELL.

MOST of us are familiar with the gray pellets, about the size of peas, which are sold to children under some such designation as "Pharaoh's serpents' eggs." When a light is applied to one of these it ignites, and expands into a long and spirally twisted coil of brittle ash that occupies much more than the space of an unignited egg. Many conditions go to the making of such a "serpent." The egg itself is composed of a mercury compound, a property of which is to combine with the atmospheric oxygen so as to form a bulky mass. A certain temperature, given at first by the application of the lighted match, is necessary to jolt the chemicals into combination. The shape of the serpent is the result, partly of intrinsic factors—such as the composition, mechanical mixture, consistency and shape of the egg; partly of external factors—such as the amount of oxygen in the surrounding air, the degree and the mode of application of the initial heat, the proportion of moisture in the air, the absence or presence and direction of draughts, the atmospheric pressure, and so forth. No doubt, comparatively violent chemical processes of this kind, occurring within a short space of time, are difficult to control; but it is easy to see that the production of uniformly shaped serpents from many eggs would involve merely the problem of making eggs of uniform shape and composition, and of allowing the chemical conflagration to take place only under uniform external conditions. In the actual experiments, made repeatedly by children, the conditions are tolerably uniform, and complete failure or the production of masses plausibly serpentine is the usual result. The vastly more complicated and delicate adjustments in the development of real eggs into real adults are similar in kind; the eggs fail to develop, or the creatures assume

an average final form in obedience to an average condition of surrounding forces, and, in so doing, bring about the average superficialities of the race.

A curious and somewhat unexpected result of recent progress in biological knowledge is, that we are learning to attach an increasing importance to the effect of the environment in shaping the whole race by shaping each individual life. When the speculations of Weismann first threw doubt on the transmission of acquired characters, it seemed to many that, were his conclusions true, the ground was cut from under belief in the efficacy of the most plainly important of the forces that mould creatures into different races; but, although we are learning to discard from our conceptions belief in the inheritance of plastic effects, we are gaining an increasing knowledge of their extent and importance on individual lives. The eggs, or germinal masses, take from their parents, of which they were part, the power to respond in similar ways to similar external forces, and children resemble their parents in so far as the external forces operating on their initial material resemble those which went to the making of their parents. It is necessary to realize that the effect of these forces is ephemeral, and that it has to be reproduced in each generation; it is no more necessary to suppose the effects inherited than to suppose that the west wind, to-day slanting a thousand columns of smoke to the east, will produce a general tendency obvious in to-morrow's calm. Were the wind always from the west, we might forget so constant a factor, and come to regard an unvaried easterly inclination as due to something inherent in the nature of smoke and chimneys.

When similar conditions persist through many generations, another factor comes into play. Only those strains capable of responding in a favorable way to the prevailing conditions succeed; and there is a continuous and gradual elimination of all the other strains, until, after a sufficient time, they have been weeded out of the stock, and, practically, only such embryos are produced as are capable of responding in a particular average way to a particular average of conditions. All life has grown old and formal with regard to the most persistent features of its environment; many circumstances, now necessary to it, were once alternatives, and many to which it is now neutral may similarly become necessary for future branches and races.

The followers of Lamarck and of Darwin alike have accumulated abundant evidence of the existence and effect of these alternative external conditions. The constitution of most young creatures, which have passed through the narrow defile of embryonic life, is robust; changes of the incident forces that would arrest the fixed reactions of embryonic life, leave the free-living creature unharmed, although not unchanged, and have a vast influence in determining the average structure of the race in each generation. Alpine life, with its combination of decreased pressure and atmospheric humidity, greater radiation and extremes of heat and cold, causes great and immediate changes in all plants and animals not killed by the new conditions. Removal from the hills to the lowlands has been shown, in the case of Auvergne and Limousin in France, to produce immediate effects on plants, animals and men. Transference to a warmer climate thins the feathers of birds and the fur of mammals. Plants that usually bear thin, hairy leaves, may produce, under the influence of excess of moisture or of salinity, smooth or fleshy leaves, and the structure of many aquatic animals varies with the degree of salinity of the water they inhabit. In the lower Fungi and in Bacteria, the whole character of the organism changes so markedly with the external conditions that, before a reasonable definition of a form can be given, bacteriologists have to pursue its metamorphoses through a multitude of changing media. The nature of the food affects the size, appearance, structure and fertility of a very large number of animals and plants. Indeed, a large part of Natural History, ancient and modern, relates to the effects of these external factors; what the French call the "circumambient media" would be accepted as the active agents in producing the average characters of races by their plastic effects on individual lives, but for two sets of reasons, one set practical, the other historical. In nature, comparative experiments are seldom found together, and we are indisposed to seek for uniform causes of uniform results, forgetting that the average uniformity is as much due to averagely uniform conditions as the modifications experimentally produced in a few cases are due to unusual conditions. Historically, the effect of the circumambient media on individual lives has been obscured by controversy as to the transmission of that effect to progeny. Quite apart from such inheritance, the individuals which form a race

owe a large part of their common or racial characters to the effects produced on the initial material in each life by similar external conditions.

In the same fashion in which the embryonic stages have become rigidly adapted to fixed conditions by the elimination, during untold centuries, of all variations unsuited to these relatively fixed conditions, the later stages may also become rigidly adapted to special conditions. Plants or animals, originally endowed with the power of responding by different kinds of growth to different kinds of climate, may come to produce only forms capable of responding to one kind of climate by one kind of growth, if for a sufficient number of generations they have been subjected only to that one kind of climate. And so, by a process of selection, races gradually come to show a higher and higher average uniformity if they are subjected to similar average conditions. The longer the same or the similar conditions persist, the higher the average must rise, not only as a result of selection to the conditions, but as an automatic result of intercrossing. In the tenth generation a man has 1024 ancestors, from each of whom he may inherit something. One thousand and twenty-four individuals chosen at random would form a fair sample of any population, and the effect of this intercrossing is to obliterate gradually individual differences, and to smooth out the whole race into uniformity. However extreme a variation any individual may present, his children, inheriting not only from him, but from all his ancestors, are likely, with respect to the abnormality, to show progression toward the mean type, if the parental variation were towards degeneracy, regression towards the mean, if it were an advance.

Naturalists have long recognized the importance of Isolation, of what Darwin called the "corner-stone of the breeder's art," in accentuating the racial effect of the various moulding forces we have passed in review. If a group, consisting of members originally similar, be divided into two isolated groups, the combination of circumambient media is certain to differ in the two cases, and, generation after generation, the isolated groups will be moulded into different characters. Next, the action or incidence of selection will differ almost inevitably in the two cases. It is, no doubt, possible to imagine that a breeder might apply precisely the same discrimination in the case of isolated groups;

but in the more occasional and less relentless action of natural selection, identity of operation and result in two separate cases is almost impossible to imagine. Next, isolation must have its beginning, and the individuals forming each isolated part cannot be absolutely identical in average character from the first. Finally, the importance of the hereditary weight of mediocrity becomes of peculiar value under isolation, as that, in the first place, means the prevention of free intercrossing. From the moment of separation, the hereditary tendencies begin to be summed up in different directions; different racial averages, increasingly different as the isolation becomes more complete and more prolonged, are produced.

We must now turn to our immediate purpose, the application of these general principles to Man. The modern white nations, France and Germany, Russia, Italy, Great Britain and the United States are species of white man in the making. The increasing fervors of patriotism and nationalism are expressions of the fact that the nations are becoming self-conscious, and are realizing their increasing differentiations. The nations do not at present possess zoological differentiation to any marked extent, and the initial material that has gone to form them is much more similar than would appear from such current designations as Anglo-Saxon, Teutonic, Celtic, Latin, Slavonic, and so forth. The stock from which have been derived these modern populations probably consisted of at least three old races. One of these, called the Mediterranean because of its historical and actual association with the shores of that inland sea, is marked zoologically by a relative prevalence of short stature, dark complexion, and long or, as it is termed, *dolichocephalic* head. The second, generally called Teutonic, although its centre is Scandinavia rather than Germany, and although it is not at all to be correlated with political Teutonism, presents the combination of great stature, marked blondness of skin, eyes and hair, and long-headedness. The third, called by Professor Ripley, the Alpine race, for obvious geographical reasons, intrudes between the others in a great wedge, its point towards the west, its base broadening through Central Europe towards Asia. It is intermediate between the others in stature and coloration, but is in marked contrast with regard to head form; for it displays a high average of brachycephaly or round-headedness.

We have no exact knowledge as to the origin of these raw materials of the modern nations, and still less idea of the forces that moulded them into their existing characters; but the speculations concerning them at least serve the purpose of stamping the conception of the races into the mind. There have been left from the far past, when the pulses of the Glacial-Period were waxing and waning in Europe, rare traces of a primitive people, devoid of what we call culture, using only the rudest of stone implements, short and squat in appearance, in skull extremely long-headed, prognathous and beetle-browed. They appear to have left practically no traces among the surviving European populations, and it is only their primitive characters and their presentation in an extreme form of dolichocephaly, a salient racial mark, that suggest the possibility of their being the primordial material from which were shaped the Mediterranean and Teutonic races. Of these two, the former were, apparently, the first to spread upwards and northwards from the warmer South, probably from Africa. Remains of men approaching them in type, occur in the long barrows of North Europe, and many anthropologists see their modern survivors in the short, dark types occasionally met with in the remoter parts of the British Islands and in Brittany. There is hardly even a plausible speculation as to the origin of the Teutonic race from the primitive stock. It has the marks of a race more modern, specialized and local than the others. Its physical characters are extremely distinct and uniform; it is peculiarly associated with the sea and rivers, and has spread out more recently than the others from a compact centre in Northwest Europe, its greatest successes being almost within historical times. As it penetrated areas already in occupation, it showed disposition and capacity to secure the more fertile districts—the coasts, the rich valleys and the cities as opposed to the country. With somewhat less uncertainty, the Alpine race has been set down as Asiatic in origin, and it reached Europe, perhaps bringing with it the so-called Celtic culture, before the historical successes of the Teutons. It gained territory at the expense of the Mediterranean race, pushing that back towards the south, and apparently this process still continues; while the Teutons succeeded and continue to succeed in squeezing the Alpine race into the hills, and in driving them from the fertile valleys by continuous pressure from the North.

Such appear to be the materials of the modern white nations. In Europe, France has the most intricate admixture of elements; it has the Mediterranean race in the South, with probable survivors along the West to Brittany; the Alpine race occupies the Alpine provinces, with great outliers in the mountainous Morvan, Cévennes, Auvergne, Cantal, Gévaudan, Limousin and Brittany; the Teutonic race has invaded from the Northwest, occupying the Paris basin, Normandy, the great valley of the Loire and the fertile country down to Bordeaux, while in a narrow band it has occupied the Rhone to the sea. Britain has abundant relics of an underlying population comparable with the Mediterranean race, and most numerous in the so-called Celtic fringes; it had, almost certainly, in the men of the round barrows, a prehistoric invasion of the Alpine race which brought the Celtic culture; but these two sets of prehistoric British have been almost completely absorbed and swamped by successive and overwhelming invasions of Teutons—Saxons and Danes and Norsemen, and Normans from the Teutonic districts of France. Italy has practically only two races, the Mediterranean to the south and west of the mountainous axis of the country, the Alpine to the north and east. Russia is typically Alpine, with well-marked traces of more recent Asiatic invasion, and with some Teutonic infiltration from the northwest. Germany, in its eastern and southern parts, is strongly Alpine, much of its area containing population racially inseparable from that of Russia on the east, and from that of Switzerland on the south, while in the northwest the Teutons, who are thus not in the least characteristic of Germany, are to be found. The United States naturally have a recent extreme mingling of all three races, as its population has come from the populations of Europe.

The initial racial material, therefore, does not furnish much ground for expecting future differentiation among the nations; modern political frontiers do not in any way correspond to these old zoological distinctions. Whatever may have shaped the races in the past, existing forces are urging nearly identical racial material in different directions, and are compelling different material into convergent forms. Attempts, innumerable and unsuccessful, have been made to associate one or other of the races with mental or moral characters. Thus, as Professor Ripley has shown, the statistics of suicide and of divorce have been plotted

out on the map of France, and the areas of their greatest severity coincide in a striking fashion with the Teutonic as opposed to the Alpine racial regions. In France, too, crimes against property are associated peculiarly with the Teutonic areas, crimes against the person with the Alpine areas, while, finally, the Teutonic regions have a relative preponderance of radicalism and republicanism and of artistic, literary and commercial success. But these associations of character and race break down completely when the attempt is made to trace them in other countries; it appears simply that they are phenomena of environment and not of race. No one can doubt that acute differences separate France and Germany along their northern frontiers; and yet Alpine and Teutonic races stretch almost in parallel lines across them. It is to the environments of the present and of the future that we must look for the differentiating forces, and not to the results of the unknown agencies of the prehistoric past.

In considering the general principles of modification of animals and plants, we found that isolation of groups was a condition, if not necessary, at least extremely favorable. It is not necessary that the isolation should be geographical, as the essential circumstance is merely the prevention of interbreeding; nor that it should be absolute, but only that breeding within a group should be more frequent than interbreeding of members of different groups. In the case of the nations, the ethnical material, although not identical, does not present important international differences. Geographical separation certainly counts towards isolation; most individuals of modern populations are as firmly fixed to their native soil as are rooted plants and slow-moving animals. At first sight, it would seem as if modern civilized man, with the modern advantages of prevision, intelligence and mechanical locomotion, must be free from the limits of geography. But reflection throws doubt on this. An animal or a savage has little but the convenience of the moment to tie him to a particular area. His world consists of little beyond the limits of his own skin, and, wherever he moves, if he find food and rude shelter, he finds himself in an accustomed home. Modern man is bound to his locality by a thousand chains, forged by his own complex needs. To uproot a peasant and transfer him with his family and belongings even into the next county is a difficult matter, and the local permanence of populations is a clearly established result

of anthropological investigation. Naturally, it is greater in the case of rural populations, and in the case of women, with the result that the women of a peasantry always display the local type in its most strongly marked form.

But in man there are barriers tending to produce isolation other than those found among animals. First, there is language, with all its implications. In most cases, among the modern white races, marriage—and isolation is simply relative infrequency of intermarriage—is not a sudden affair of the passions, but a complex adaptation of interests, more difficult and less likely to be successful when the partners speak even different dialects. In this, as in other racial matters, individual exceptions prove nothing, their results being swamped in the broad averages; and it cannot be doubted that language helps to isolate the nations as practically as stormy arms of the sea or as snowy mountain-ranges. With language, in the case of man, and increasingly in the case of civilized man, there are associated a thousand barriers of thought and feeling, memories of past history, political and social ideals, differences that even where the geographical barriers are overcome tell strongly against any prevalence of interbreeding. A similar, and comparatively new, check on facilities of intercrossing is given by the innumerable regulations, made for diverse political, fiscal and military reasons, hedging the passage of the frontiers. All the great nations, while they welcome the casual visitor, are beginning to scrutinize the alien immigrant, some of them accepting him only under severe conditions, all of them holding him in little favor. It is needless to labor the point; we may take it as proved that the modern nations, almost year by year, are adding to the barriers that prevent free intercrossing of their populations, and are thus securing those conditions under which zoological, divergent modification is most rapid.

The seclusion of the nations is aided in another fashion by a process in which man himself plays a part. A breeder may divide his herd in two ways. He may take numerical halves at random and may allow the two groups to breed separately. In course of time, this "separate" breeding will result in differentiation between the groups. But the breeder, pursuing another principle, may place in one group all those displaying some character, say muscular activity, in another all those displaying, say, a docile temperament. In each generation he may continue this "segre-

gate" breeding, by transferring from one group to the other any forms which appear better suited to the group in which they were not born. Naturally, under such conditions, differentiation of the two groups in divergent directions is much more rapid, and in the case of the nations many processes with a similar result occur. There is a continuous elimination from many of the nations of those who by inborn disposition are out of harmony with the political systems and ideals of their natal lands. From Germany and Italy, and to a lesser extent from France, there is a drain of those who fear or dislike compulsory military service, and the ideas associated with a dominant militarism. From Russia, not only poverty and anti-Semitism, but aspirations for freedom and education, have expatriated many of her sons. America has been populated largely by immigrants repelled by the religious and caste systems of the Old World, and it begins to appear as if to a lesser extent the American peculiarities were being strengthened by the voluntary removal from the States of the sporadic types (abnormal there) in whom have appeared or persisted the old microbes of caste. The same conscious preferences act negatively. The military nations will not attract, and would not for long retain, immigrants of other dispositions. Moreover, the social systems of every nation aid in the differentiation by favoring individuals with a natural bias harmonious with the average disposition of the nation, and by hindering those naturally least harmonious. In France, for instance, despite the froth of the Boulevards, that man in whom, as Zola put it, the red corpuscles of the blood are Royalist, is more likely to be provided with a special train to the frontier than with the opportunity to place his kinsmen in prosperity. The great Russian thinkers on questions of economy, or even on science, find their way to Geneva or to London; the easy acceptors of an autocratic system rear families in bureaucratic comfort.

We must now turn to international differences in the direct action of the circumambient media, moulding the nations in different directions. In this subject, so far as man is concerned, we are as yet confined largely to analogy, and can hope for little more than to establish a case for further investigation. Although all the more fundamental conditions for the nine months' growth of embryonic man have long since been rigidly fixed, there is still reason to suspect that external conditions can play varying

parts. Extreme cases are known in abundance. Alcohol, cocaine, many bacterial poisons, and diseased conditions act on the growing embryo, through the blood of the mother, not only in the negative fashion of stunting growth, but positively, producing structural characters and physiological peculiarities. The influence of the nutrition of the mother is equally far-reaching, and has much to do with determining the physiological rhythm of the child. Children born of parents in a foreign land often differ from those born of the same parents in their own land, in fashions the analysis of which is baffling and obscure, but the total result of which is unmistakable. In the more usual case, where children are born in the land of their parents, it is impossible to doubt that the manifold differences in different countries as to the care, treatment, feeding and general conditions of pregnant women do play a notable part in determining the average national characters.

There is also an important selective action due to different environments. The practical measure of fertility is the number of children born alive. The causes that lead to the premature death of embryos have been little studied from a general point of view, but some known facts are suggestive. Statistics collected in one country showed that the average size of the head was greater in still-born children than in children born alive. Taking only in the most general way the relation between size of head and size of brain, and between size of brain and chance of intelligence, it may appear from this that conditions determining the physique of mothers and the choice of mothers may be setting limits to the brain-power of the race. Such conditions belong to the environment; they are questions of climate, food, air and so forth; and still more of the requisites sought for in wives, and the ideas according to which women are chosen or allow themselves to be chosen. All such conditions are essentially local, differing from nation to nation.

All marriages are not fertile, nor fertile to the same degree. The percentage of children produced by a total number of couples differs in different countries, according to innumerable differences which are part of the national environment and character. Climate, mode of life and food are obviously differentiating agents, but the habits, ideas and economic systems of the nations have more to do with it, partly by determining the average age at

which the responsibilities of married life are assumed, and partly in a more direct fashion. Prudential restraints on fertility assume an extreme importance in different nations, according to their general prevalence, and still more according to the sections of the population which exercise them most. Local conditions, mental, moral and economic, determine whether any class at all sets deliberate limits to its natural fertility, and whether it is the landholding, the professional or the urban populations which handicap themselves in their contributions to future generations. Moreover, not only the absolute fertility but the incidence of fertility differs with local conditions. Suppose that, of one hundred couples, eighty become fertile in one environment; if the same hundred were transferred to another environment, eighty might still be fertile, but it would be a different eighty. The incidence of the percentage of children with regard to the whole population varies with physical conditions and with mental, moral and economic factors, and operates not merely through influencing the fertility of married couples, but in choosing the couples that do marry.

The final result of this part of our subject is that environment, in the largest sense of the word, is a great agent in producing, from similar initial stocks, populations of very different average character, partly by direct action on development, partly by affecting the percentage of fertility and the incidence of that percentage. All these results occur separately in each generation; but, apart from any inheritance of acquired characters, they must be summed up in the course of generations by the continual elimination of certain elements, and by the continued favoring of other strains in the populations.

When we turn to consider the action of the environment in moulding the youth and the adult, we are on ground much of which is familiar, although it has not been systematically explored. When a special environment acts for even a limited period on an adult, it almost invariably writes on him a local mark. Who has not noticed such in an American returned from five years in the *Quartier Latin*, in a young Scot on holiday from a New York counting-house, in a member of the Embassy of any country home from service in a foreign land? We set down the changes to imitation, conscious or unconscious, and think little of the slight alterations in dress, the new tricks of intonation and

gesture. But even these, superficial as they are, are the results of reactions to new ideas and new circumstances; they are the beginning of the most salient differences that give character to modern races. But these changes, and still more the changes in physiognomy, palate, habitual diet, digestive power and so forth, all have their definite physical correlates in the tissues and fibres of brain and body, and in the physiological rhythms. The body has become different, different in itself and in its reaction to normal and abnormal stimulation. All such changes are produced in a more marked fashion when they act throughout life, and in a fashion still more marked when they act from one generation to the other, gradually moulding the whole population in one direction.

With modern civilized people, however, the circumambient media have their greatest effect on mental qualities, and it is by mental qualities that men are most markedly separated. Profound and increasing differences of temperament and of idea, the cumulating products of environment, tend to separate the nations. Here there is an enormous difference between characters peculiar to man and those which he shares with lower animals. Physical differences are slow-moving secular affairs, their summation being effected, probably, only through the ages by selective elimination. It is improbable that their effects are transmitted; each new individual has to be restamped by the environment, the only difference from generation to generation being a slow elimination of material refractory to the prevailing mode of stamping. The results of the environment on the mind are reflected in literature and the press; they traverse whole populations with almost instantaneous rapidity, and yet limit themselves to the confines of one nation, since the members of a nation that read an alien literature or that take their daily prejudices from an alien press are a negligible quantity. And every new acquisition by a literature is inherited; the new generation begins with the stage at which it found its predecessor, and every wave of emotion, of sentiment, of idea, that traversed the former generation is stored in its literature. There is no greater difference in the acquisition of characters than that between a plant propagated by slips and a plant propagated by seeds. The whole series of the former and its descendants is a continuous life; the effects of each kindly ray of the sun, each pruning or grafting by the gardener, of each

condition of soil and temperature, are permanent things, lasting while the plant lasts. But, however a plant may have been cherished and changed in its individual life, the seedling grown from its seed has to start afresh from the dim beginning of life. Literature is a new organ of a nation, integrating its units into a new whole by a new circulation, and this new organ retains permanently the results of each generation, and is the great example of rapid change by the complete summation of all acquired characters, corresponding in this respect to the generations of a plant propagated by slips.

The ideals, emotions, political and social systems, conceptions of religion, of justice, of public danger and public utility, and the commercial and military organizations, are complicated modern factors which tend more and more to mark off the nations, and all these grow and accumulate by the new method peculiar to man. These differences, profound, far-reaching and acute, are felt the moment the frontier is traversed; and, when some special crisis brings them into prominence, we find that already members of two nations find it almost impossible to come to common ground in working out what would appear to be the simplest and most common problems of morality or justice. I have heard an average, honest Englishman argue by the hour with an average honest Frenchman on the Dreyfus case, with the result that each saw in the other a stupid or cynical perverter of morality. All such differences act afresh on each generation subjected to them, but with a growing force, the result of their accumulation in the perennial and enduring stock of written and spoken ideas.

In association with all such growing differences as we have been passing in review, selection acts strongly, favoring the natural variations in accord with them, eliminating the naturally inharmonious variations. A simple example may serve to illustrate this operation. Each form of athleticism requires for its supreme display some different combination of natural qualities. The rowing-man, the cricketer and the cyclist employ different groups of muscles, different senses, different forms of endurance, and different mental and physical capacities. Before cycling was invented, the peculiar combination of qualities necessary for great success in that sport without doubt existed, but passed unnoticed and unrewarded. With the appearance of cycles, cycle-racing and the advertising needs of cycle manufacturers, there came into

existence the demand and the reward for the possessors of the combination, hitherto valueless, and, almost simultaneously in many countries, the new type came to meet the new demand, not created by it, but selected by it.

And so in different countries different factors stimulate different sets of the population; the incidence of favor and of rejection differs. Education, conducted on different standards and with different aims, brings rewards to different kinds of natural variations, and makes different sets of natural variations unsuccessful. The modern English reverence for success in athletic sports is the result of a profoundly complex combination of mental and physical factors. It brings with it more commercial reward to the holder of a University "blue" than to the holder of a University fellowship, and brings success—on the Stock Exchange, in business, in the teaching profession, and even in the Church—to the "good sportsman." Spreading favor and disfavor in a thousand ways, it affects the incidence of prosperity, and gives the national type a permanent set. In what direction any particular factor serves to bias the future, is an intricate problem not easy of solution. For what are selected are not peculiar qualities, but men in whom these are prominent, and with the men are favored, as if by accident, all the other individual peculiarities possessed by them. Moreover, in a paradoxical fashion, insistence on certain qualities may lead to the extinction of these. In Catholic countries, for instance, where the celibacy of the clergy is required, it would seem as if from each generation there were eliminated those elements of the population in which the ideas of purity and of religion were most strong and most faithfully fulfilled. In a succession of wars, those most ready to fight for their country are the most likely to be eliminated, and in this we may find explanation of the strange fashion in which rowdy and exuberant patriotism is the product of years of peace, while devastating wars, by killing off those most ready to fight, inaugurate a compulsory era of peace.

It is impossible within the limits of this article to follow out in detail the interactions of environment, selection and population from even the general point of view, and still more impossible to work out individual cases. Of the many problems awaiting compendious treatment, perhaps the most immediately interesting are presented by Great Britain and the United States, the

two nations fatuously grouped as Anglo-Saxon. Every possible indication points to diverging paths for these. The initial material, in the first place, differs more than most of us care to admit. The population of America has come from every nation in Europe; that of Britain, for many hundred years, has received only trifling accessions from other lands. The population of America has been drawn from Europe not merely by blindly chosen samples, but by a process of selection, in which the spirit of adventure, of enterprise, of determination to risk unknown rather than to endure known evils, have played a great part, not only in stocking America with these characters, but in depleting Europe of them; and who shall say that the almost febrile activity of America is merely the exuberant vitality of a young nation, and not so much the result of a definite selection from the stocks of Europe? The mode of life, climate, food, moral and social ideals, political aspirations, legislation, press and literature of the two nations all differ so profoundly, and the proportions of inter-marriage as compared with home marriage are so small, that he must indeed be blind to the plain facts of science who expects any other result than the production of increasing divergence. And finally, the two nations are in different stages of zoological progress. Great Britain is in the case of an old race which has spread to many distant regions, and in which local differentiation is proceeding along different lines. The United States are in the younger stage of integration; notwithstanding their huge continental area, what appears to be occurring is the gradual breaking down of the differences which, in a less populated stage, began to be formed; and the result is that an American type and not a series of local types is being produced, a type which will be new, and as unlike the Englishman of to-day as he is unlike the Frenchman or the Russian.

The general conclusions towards which I have been leading in this essay are simple. There are known very many factors the operation of which leads to the differentiation of common stocks of living beings into new species. The goal of this process is reached when the species differ so much in body, habit and disposition, that even in the absence of isolation they are relatively or absolutely infertile with one another. I have attempted to give evidence of the existence and operation of such factors, and, in addition, of special new factors in the case of the modern white

man. The subject is vast and complex, and there is clamant need for prolonged and careful collection and classification of the facts, and I hope that, at the least, I have made out a case for such new study. In the old times, man was an animal, swayed only by the rude forces of love and hunger; and yet, under conditions of which we are ignorant, primitive man broke up into well-marked physical types, such as Negro, Mongol and White, and the beginnings of infertility are at least suspected to exist between these. The infinitely subtler and more responsive nature of the modern white man, and the greater complexity of the forces that play on him, render him liable to diverging changes more complete and more rapid. I believe that the great nations are *foci* of these changes; that they are incipient species moving apart with increasing rapidity, under the stimulus of all the factors and conditions which have made species in the past, and driven by new forces heretofore unknown.

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